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ABSTRACT

An analysis is presented of students' attitudes in a leadership training program and the relationships between those attitudes. Student attitudes toward the program facilitator as a person affected their attitudes toward that person as a teacher and role model, also affecting the student's sense of belonging in the group. Student's acceptance of others affected his/her sense of belonging and feelings of self-acceptance. Attitudes toward the class were affected by attitudes toward the facilitator as a role model and by a sense of belonging. Willingness to speak out in class was affected by the student's sense of belonging and feelings of self-acceptance. The use of skills outside of class depended on the student's attitude toward the course. Feelings of mastery depended on the student's willingness to speak out in the group and on the use of the learned skills outside of the class. Tables and figures delineating the analysis of this research are appended. (Authors/JD)

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Occasional Paper No. 3

A CAUSAL ANALYSIS OF ATTITUDES TOWARD LEADERSHIP TRAINING IN A CLASSROOM SETTING

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Abstract

This paper presents a longitudinally replicated and cross-validated path analysis of students' attitudes in a leadership training program and the relationships between those attitudes. Student attitudes toward the program facilitator as a person affected their attitudes toward the facilitator as a teacher and role model, also affecting the student's sense of belonging in the group. The student's acceptance of others affected his/her sense of belonging and feelings of self-acceptance. Attitude toward the class was affected by his/her attitudes toward the facilitator as a role model and by sense of belonging. Willingness to speak out in class was affected by the student's sense of belonging and by his/her feelings of self-acceptance. The use of skills outside of class depended on the student's attitude toward the course. Feelings of mastery depended on the student's willingness to speak out in the group and on his/her use of the learned skills outside of the class.

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A CAUSAL ANALYSIS OF ATTITUDES TOWARD LEADERSHIP TRAINING IN A CLASSROOM SETTING[1]

John E. Hunter,
Ronda F. Hunter, and John E. Lopis[2]

Background

There have been many studies using group processes for the training of leadership skills and for personal development. The primary focus of these studies has either been to introduce specific techniques or to show that such methods are effective in altering the participants' interpersonal behavior. The purpose of this paper, however, is to present a theory of the development of affect and attitude within leadership training groups which we believe to be applicable to group training programs. Although this model has been tested on a specific training program in an educational setting, we believe that the principles used in the derivation of the theory can be generalized to other contexts.

In his history of group process movements, Yalom (1970) draws a distinction crucial to our work. He writes about Kurt Lewin who, immediately after the second world war, started a "training group" project which his students subsequently turned into the "human relations movement." The purpose of the training group was to teach

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[1]Paper presented at the Midwestern Society of Multivariate Experimental Psychology, May 5, 1977.

[2]John E. Hunter is an MSU professor of psychology and mathematics. Ronda F. Hunter is a research intern at the Institute for Research on Teaching, and John E. Lopis is an assistant professor of teacher education and secondary education and curriculum.

participants the interpersonal skills of being an effective group member (observant participation, feedback, interpersonal honesty, etc.) and a productive group leader (e.g., to increase the influence of subordinates, to initiate organizational change, etc.). The role of the group leader or "facilitator" was to instruct (he/she provided a cognitive definition of the skills to be taught), to be a role model, and to provide feedback to the other members of the group as they practiced the interpersonal skills.

In the 1950s, a sizable subgroup within Lewin's original training group had begun to change the basic goals and, hence, the techniques for the group process. These "sensitivity" training groups shifted their goal from leadership training to personality change and self-actualization and became the forerunners of today's widespread "encounter" groups.

The first program in teacher education based on group processes was Mann's (1967) work at Harvard. His program and those which followed it used the techniques of sensitivity training. These early attempts were plagued with unclear or nonexistent objectives, poorly trained personnel, and the lack of research and evaluation needed to improve the programs to a recognizably effective level. Such difficulties were identified clearly by Wiggins (1970), who felt that the role of training in teacher education would improve if (1) the term "sensitivity training" were replaced with "human relations training," (2) standards for trainers were developed and enforced, (3) clearly defined goals and behavioral objectives were established, (4) research was done to establish the validity of techniques, and (5) evaluation models were established to assess the results of

training programs. The most systematically designed teacher education program which meets most of these objectives is the human relations program at the University of Georgia adapted by Gazda, Asbury, Balzer, Childers, Desselle, and Walter (1973) from the model developed by Carkhuff (1969), who based his program on Rogers' (1957, 1965) therapeutic concepts: accurate empathy, non-possessive warmth, and genuineness.

Also in the late 60s, planners of Michigan State University's Education 200 program were initiating a focus on the socioemotional education of children. The program planners had decided to shift from the traditional educational approach to a group experience approach directed by a classroom teacher who would be viewed as a group facilitator and who would be expected to be trained in group dynamics. Since the critical focus of the ED 200 planning committee was on training in specific skills, the encounter group and sensitivity training approaches were rejected. Instead, an Interpersonal Process Laboratory (IPL) based on the presentation, demonstration, and practice of specifically stated interpersonal communication skills was designed to aid preservice teachers in communicating with those around them in both the cognitive and affective domains (Lopis, Note 1). Thus, the ED 200 approach, which represents a return to the spirit of the original training groups, is the setting in which this theory was developed and the research carried out.

Theory

Our basic hypothesis is that learning in a group process situation will only occur if the student is willing to accept feedback from others in the group, most notably the facilitator (in this study,

the teaching assistant). Therefore, positive attitudes toward the course are prerequisites for learning. Attitude has not been a problem in the ED 200 course because ordinary student evaluation forms have long established that students feel very positively toward the course. However, the evaluation instrument does not say anything about why students feel positively or about the causal sequence of the development of positive affect in the course. There is little in the student evaluation form that is directly applicable to the improvement of the course or to the testing of hypotheses as to why various elements of the course might be effective (or otherwise).

We developed an alternative evaluation instrument, which we call SALT (Student Attitudes towards Leadership Training). This instrument was intended to tap attitudes we thought were theoretically related to the causal sequence of the development of affect toward the course and the interpersonal learning taking place as a result. The complete psychometric report on our inventory is available elsewhere (Hunter, Hunter, Downing, and Lopis, 1977) and describes the elaboration of our ideas over nine empirical studies and five revisions of the inventory. The present paper is an attempt to test the original theory about the development of affect by subjecting the correlations between the scales to a path analysis.

Table 1 (appended to this report) contains the names of the 10 scales which make up our inventory and the items which make up those scales. Three of the scales are reactions to the teaching assistant as a facilitator (as a person), as a teacher, and as a role model for the leadership skills. Three scales are reactions to the group: acceptance of others, a feeling of belonging to the group, and the desire

to talk. Two scales register response to the content of the training program: whether the student liked ED 200 and how he/she used the skills learned. And finally, two of the scales are attitudes toward self: self-acceptance and mastery. Our theoretical predictions as to the causal relations among these attitudes were based in part on the phenomenological reports of students who had taken the course and in part on theoretical back-tracking on the notion that mastery requires acceptance of feedback which requires that the person say something significant and trust the other person who responds. These in turn require .... The path diagram consistent with our original theory is shown in Figure 1 (appended to this report) and most of this theory was borne out in the data we will present.

When the student first enters the class, his interaction is largely a matter of listening to the teaching assistant and responding to the assistant as a person. Thus, we assumed that the first attitude to develop would be toward the teaching assistant as facilitator. This attitude in turn would shape the student's later reaction to the teaching assistant as a teacher and as a role model. This assumption is represented in Figure 1 by causal arrows from "teaching assistant as facilitator" to "teaching assistant as teacher" and "teaching assistant as role model."

The other attitude which begins to form early in the class is the attitude toward other students in the group. We believe that in the beginning, people are rather ambiguous stimuli and can easily be perceived as either positive or negative. Therefore, we predicted that students' reactions to the other group members would be largely a function of their own initial feelings about other people, i.e., their

general attitude toward other people as formed before they took the course. Thus, we felt that the primary causal agent in the development of attitudes toward their peers would be the extent to which they entered the class prepared to accept and trust others. Our scale, "acceptance of others," is largely composed of items which ask whether other people can be trusted with personal information or whether they will "use it against you."

Students will feel that they belong in the group if they like the other people in the group (including the teaching assistant). We predicted that people would assume that the assistant liked them to the extent that they liked the assistant. Thus, we predicted that a causal effect of the student's attitude toward the teaching assistant as facilitator would affect the student's feeling of belonging in the group. Similarly, we predicted that people would perceive themselves as being liked (or at least accepted) by the group to precisely the extent that they accepted the others. Thus, we predicted that a causal effect of acceptance of others would be a feeling of belonging.

We believe that if people feel negatively toward other people in a group they cannot feel positively about themselves in that group; cases of hostile arrogance are a sham--such persons actually feel very uncomfortable about themselves. Therefore, we predicted that the extent of a student's self-acceptance in the group would be a function of the extent to which he/she accepted others.

The extent to which a student is willing to speak out in class is a function of two things: (1) how the student feels about the other people in the group, (his/her level of trust), and (2) his/her level of self-confidence. We predicted that "like to talk" would be causally

dependent on feelings of belonging to the group and on feelings of self-acceptance.

Most causal effects in our inventory can be traced back to two attitudes: acceptance of others and attitude toward the teaching assistant as facilitator. How are these two attitudes related to one another? There are at least two lines of argument. Since the teaching assistant is a stranger, it seems reasonable to assume that the student will be predisposed to like the assistant to the extent that he/she is predisposed to like other people in general; there is a causal effect of acceptance of others acting on the student's attitude toward the teaching assistant as a facilitator. One might also argue, however, that it is the facilitator who sets the original climate of interaction in the group to the extent that the assistant sets an example of positive feeling toward others. This line of argument suggests a causal effect of attitude toward the teaching assistant as facilitator on the acceptance of others. (We note that both arguments might be correct.)

In the predicted path model, we have responded to this ambiguity in our reasoning by linking "teaching assistant as facilitator" and "acceptance of others" by a curved double-headed arrow. In path analytic terminology, this means that both variables are treated as "exogenous" variables. We are not stating the causal determinants of these variables in the model, i.e., we are avoiding the issue in the present analysis. Given the rest of our model, there is no way that these various hypotheses can be differentiated in cross-sectional analyses. We do, however, have longitudinal data which, when analyzed later, may help to disentangle this theoretical bind.

Mastery of the leadership skills taught in ED 200 depends on the discovery and correction of weaknesses. Thus, the student must speak enough about significant topics so that others can provide feedback. We predicted that mastery would depend on the student's willingness to communicate. There will be no learning from the feedback, however, unless the student is willing to accept it. Thus, we predicted that mastery would depend on the extent to which the student would accept feedback from others. This, in turn, is a function of the extent to which the student has accepted the premise that feedback is a positive opportunity rather than a negative judgment. If a student has accepted that premise, then he has accepted the basic philosophy of ED 200 and should thus be using the skills in everyday life. A student will accept feedback from others only to the extent that he is willing to provide it to others. Therefore, we predicted that mastery would be causally dependent on "like to talk" and on "use skills."

We surmised that the extent to which the student would use the skills learned in the course would be a function of response to the teaching and response to the group. We predicted that use of the skills would be causally dependent on "teaching assistant as teacher," on teaching assistant as role model and on "belonging to group." This prediction was not confirmed by the data, however, and our error here is related to the following error.

We pictured the student's global response to ED 200 as the final element in the causal scheme as the summing up of his/her experience with the course. In particular, we believed that student evaluation would be a function of perceived level of mastery and enjoyment or dislike of the group setting. The student's overall attitude toward

the group setting, we believed, would be best measured by his/her willingness to speak out in the group. Thus, we predicted that "like ED 200" would be causally dependent on "mastery" and on "like to talk." This reasoning was disconfirmed by the data.

What the data showed was that the student's global reaction to ED 200 was not the final element in the causal chain, but rather developed much earlier than anticipated; it acted as a causal antecedent to some of the other attitudes. In particular, the global attitude toward ED 200 was the causal determinant of whether or not the student used the skills taught in ED 200. Thus, "use of skills" did not depend directly on the predicted teaching and group acceptance variables, but depended on "like ED 200." The global response to ED 200 depended on the student's feelings of belonging in the group and on his/her acceptance of the teaching assistant as a role model. The one surprise in this reordering of causal priorities is that the global attitude does not depend either directly or indirectly on the student's evaluation of the teaching assistant as a teacher of the cognitive material. The corrected path diagram appears in the results section to follow.

The Literature

There is a vast amount of literature on affective processes within groups; nearly all of it, however, is practitioner's reports (the sharing of techniques, stories, and admonitions among people who have led a great many groups of one sort or another). Although the individual hypotheses in our theory are in accord with the bulk of this literature, no systematic and integrated theory could be found.

Surprisingly, only a handful of empirical studies have been published on affective processes within groups, and these studies focused on leader behavior rather than member response. Such literature has been reviewed by Hurley (1976) who notes that most writers maintain the importance of one of two dimensions he calls ARO and SAR. Leaders differ in the extent to which they accept or reject others (ARO) and in the extent to which they are self-accepting (and assertive) or self-punishing (and submissive) (SAR). Hurley cites considerable evidence (including a long series of studies such as Hurley, in press, and Hurley & Pinches, in press) showing that both traits are relevant to the success of a group leader.

Our theory predicts that these traits are also crucial for the members of a group; the data described in the Methods section show this to be the case. However, we differ from Hurley in postulating a direction of causal influence between these traits. Our theory predicted that acceptance of others determines self-acceptance (because people who reject others must ultimately answer the internal question "If you're so much better than everybody else, then why aren't you popular?"), and the data support this contention.

Method

Procedure

The data reported here were gathered from two classes during two successive quarters. During each quarter, the SALT inventory was administered three times: after the third week, after the sixth week, and after the ninth week (during the last week of the term). Students were asked to respond honestly, and they were assured that their indi-

vidual responses would be held in confidence.

Subjects

The potential set of subjects for this study were the 865 students who took ED 200 at Michigan State University during the winter and spring quarters of 1977. However, the exact set of students who appears in each analysis is a function of the vagaries of attendance. The number of students who responded to each administration of the SALT inventory during winter were 450, 469, and 447 for time 1, time 2, and time 3, respectively. The number of students who responded during spring quarter were 317, 307, and 331 for time 1, 2, and 3, respectively.

Analysis

The item analysis reported in Hunter, Hunter, Downing, and Lopis (Note 2) yielded an estimate of coefficient alpha for each scale at each point in time. The correlations between scales were corrected for attenuation using these reliability estimates. The resulting correlation matrix was then subjected to path analysis using the "OLS" method of estimating path coefficients (Heise, 1975). That is, the numerical strength of each link in the path diagram was obtained by doing a simple or multiple regression of each variable onto its causal antecedents. If a variable has only one antecedent, then the path coefficient is the correlation between the dependent variable and its antecedent. If there are two or more antecedents, then the path coefficients are the beta weights. The value of the double-curved arrow

between the exogenous variables "teaching assistant as facilitator" and "acceptance of others" is simply the correlation between them.

In the reproduction of the correlations from the path diagram, the errors would not be expected to be uniformly distributed unless the sample size were so large that the estimation could be regarded as perfect. Otherwise, the estimated correlation from the model depends on the length of the causal paths which go into that estimate. The longer the causal path, the greater the cumulated error in the estimate of the predicted correlation. In the tables that follow, this means that the largest errors would be predicted on a priori grounds to fall in the top left (or bottom right) corner. For a median sample size of 776, using the average reliability of .70, the standard error of each correlation should be about .05. Thus, the average error in reproducing the correlations would be about .05 if the model fit the data exactly and all errors were due to sampling error.

The analysis took place in three stages. After the first administration of the SALT inventory of winter quarter, the a priori model described in the introduction was tested and found wanting. We then formulated the alternative model (our final model) and tested it against the same data. This model was longitudinally replicated against the second and third administration data for winter quarter. The spring data served as a full independent cross-validation of our revised model at all three points in time. Finally, the data for both quarters were pooled to provide the best possible estimates of model parameters.

Results

Two quarters by three administrations produces six path analyses, and each of these is reported in the appendix. For the most part, spring quarter data provided an almost perfect cross-validation of winter quarter results. An indication of the closeness of the cross-validation can be seen in Table 2 (appended). Table 2 shows the sum of squared errors in reproducing the correlation matrix from the path coefficients for various data sets. The row of values for winter quarter represents the results that would typically be obtained for a one-time study: the sum of squared errors in the winter data using parameter estimates taken from the winter data. Since the sum is calculated over 45 correlations, even an error level of .46 represents a pattern of small and inconsistent deviations, and a level of .27 is quite a good fit.

For spring quarter, there are two rows in Table 2, one for cross-validation and one for independent parameter estimation. The first row for spring quarter contains the total squared error in reproducing the correlation matrix from the estimated path coefficients generated by the winter data. These figures show that the fit of the model using the winter data is about as good as the fit of the winter coefficients to the winter data itself. The second row for spring is the total squared error using path coefficients estimated from the spring data, i.e., the analysis which treats the spring data as an independent data set. The fit of the spring estimated path coefficients is about the same as the fit for the winter coefficients.

The last row in Table 2 is the row for the combined data. Since this data consists of roughly half winter and half spring data, no

concept of cross-validation is reasonable and hence only one analysis is presented. The total squared error is much less for the combined data than for either subset, as would be expected on the basis of reduced sampling error. Since the cross-validation supported the revised model which we constructed on the basis of the first administration of winter quarter, all statistical estimation should and will be based on the combined data. Thus, all further textual references will be to the combined data.

Table 3 (appended) presents the basic results for the path analysis at each point in time. For each point in time, Table 3 presents the obtained correlations, the reproduced correlations, and the errors in the reproduction. The estimated path coefficients are shown in Figure 2 (appended).

The main thrust of Table 3 is quite simple: the path analysis fits quite well. The size of the errors is at about the chance level once the location of the errors (for variables separated by long chains) is taken into account. Furthermore, the errors are small in magnitude in comparison to the size of the correlations being fit. Thus, there are no departures from the path analysis worth discussion.

There are two principal facts which are shown in the path diagrams of Figure 2. The most important fact was noted in the introduction: the global attitude toward ED 200 did not behave causally the way that we thought it would. Instead, "like ED 200" acted as the causal antecedent of "use skills" and hence as the causal intermediary between the teacher variables and mastery. Moreover, since the global attitude developed earlier in the causal chain than we had anticipated, its causal antecedents were not "mastery" and "like to talk" as pre-

dicted, but were "teacher as role model" and "belong to group."

The other important fact in the path diagrams in Figure 2 is that the size of the coefficients increases over time. This reflects a corresponding increase in the correlations over time. This is what would be predicted if we assume that all causally antecedent variables outside the model make their contributions to only the initial values of the attitudes measured. That is, the data are consistent with the assertion that the model presented has captured all of the principal causal variables operating during the course.

Discussion

We have tested a model of the development of affect during leadership training using the methods of group dynamics. Only one minor change was required in our initial theory: the role played by the global attitude toward instructional process. Furthermore, this alteration was not inconsistent with the other hypotheses that were supported by the data. Thus, the main thrust of our theory was directly supported by the path analysis.

The principal implications of the model lie in the prediction of the effects of experimental or institutional changes on the affective variables in the model. Any intervention which altered the level of students' initial reaction to the teaching assistant as a person would have ramifications for nearly every other variable in the model (through successively smaller effects for the variables farther and farther down the causal chain). The other key variable in this respect is the student's initial attitude to be accepting of others. On the other hand, an intervention which effected the use of skills would

have further ramifications only for mastery and would not in itself have effects on the causal antecedents of the use of skills.

The one unanswered question about our path model is the relation between attitude toward the teaching assistant as facilitator and acceptance of others. This relation could not be assessed with the cross-sectional analyses which we have carried out to this point. However, we hope to disentangle them in the longitudinal analyses which we are presently conducting.

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TABLES AND FIGURES

TABLE 1. The items and scales which make up the SALT inventory. (Hunter, Hunter, Downing, & Lopis, 1977)

TA AS FACILITATOR

41. My TA is helping me feel that I belong in this group.
11. My TA is helping me feel like sharing myself honestly with this group.
1. My group leader usually helps me feel comfortable in the group.
22. I feel that my TA cares about me as a person.
32. In general, I am very satisfied with my IPL group leader.

TA AS MODEL

12. My TA usually gives me responsible feedback.
2. My TA gives me positive feedback.
23. My TA gives me constructive negative feedback.

TA AS TEACHER

36. My TA presents the ED 200 subject matter in a way I understand.
24. My group leader clearly communicates the IPL objectives.
35. My IPL instructor clearly explains the criteria for my mastery of the IPL objectives.
13. My TA adequately integrates the ED 200 content (textbook material) with the IPL.
42. My TA's explanation of textbook content confuses me.

ACCEPTANCE OF OTHERS

20. I feel that my individuality is disregarded in IPL.
21. On the surface there is a lot of acceptance in my IPL, but I don't think it's genuine.
31. I find many of the experiences in the IPL disturbing.
9. I fake much of my behavior in order to pass the IPL.
33. People who have self-disclosed negative things about themselves are treated with less respect afterwards.
40. Students should not be expected to discuss their personal feelings in order to "pass" a required course in the College of Education.

BELONG IN GROUP

15. I feel I belong in this group.
4. Most (or all) group members help me feel good about what is happening in the group.
25. My IPL group demonstrates acceptance of differences.

LIKE TO TALK

16. I usually feel like talking in my group.
5. I feel comfortable participating in my group.
38. I try to talk as little as possible in class.

SELF-ACCEPTANCE

14. In my IPL group I usually don't say much for fear of saying the wrong thing.
10. I don't say much in my IPL because I'm afraid others will criticize me.
3. When I talk in my IPL, I get self-conscious and have difficulty saying things well.

LIKE ED 200

43. In general, ED 200 is a positive experience for me.
30. I would not look forward to participating in another group experience like IPL.
19. In general, I believe that ED 200 is a more worthwhile course than most at MSU.
8. If an advanced IPL group were offered, I would want to take it.
39. My experiences in ED 200 have increased my desire to teach.

USE SKILLS

6. The IPL skills are very helpful to me now in my everyday life.
17. As a result of my IPL, I feel that I now respond more adequately to others.
44. The skills I learned in ED 200 will definitely be useful to me as a teacher.
28. I use the IPL skills only during the group (not in my daily life).

MASTERY

7. I am satisfied with my own progress in mastering the IPL skills.
18. I am satisfied with my own level of mastery of the IPL skills.

RESIDUAL

34. My TA models active listening.
29. I feel enthusiastic about mastering the IPL skills.
26. I talk more in the IPL than in any class I've ever had.
37. My TA does not confront me in the IPL group.
27. I'm afraid for people to find out what I'm like because they'd be disappointed.

Table 2. The total squared error in path models for various subsets of the data.

	Median Sample Size	Time 1	Time 2	Time 3
Winter quarter	450	.46	.29	.27
Spring quarter using Winter coefficients	317	.49	.29	.40
Spring quarter	317	.31	.34	.53
Combined data	776	.31	.25	.33

TABLE 3 The assessment of the path analysis at each point in time for the combined sample: the observed correlations, the reproduced correlations, and the error matrix for each administration (N = 767, 776, and 778 respectively).

TIME 1

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	72	69	79	82	28	60	57	56	26
ACC	72	100	61	45	87	54	70	63	63	24
TEA	69	61	100	56	62	20	41	38	45	33
MOD	79	45	56	100	61	24	49	42	48	28
BEL	82	87	62	61	100	43	61	81	60	35
SLF	28	54	20	24	43	100	24	80	18	42
ED2	60	70	41	49	61	24	100	50	80	29
TLK	57	63	38	42	81	80	50	100	49	50
USK	56	63	45	48	60	18	80	49	100	40
MAS	26	24	33	28	35	42	29	50	40	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	72	69	79	82	39	55	68	44	36
ACC	72	100	50	57	87	54	54	80	43	41
TEA	69	50	100	55	57	27	38	47	31	25
MOD	79	57	55	100	65	31	51	54	41	30
BEL	82	87	57	65	100	47	62	83	49	43
SLF	39	54	27	31	47	100	29	82	23	38
ED2	55	54	38	51	62	29	100	51	80	37
TLK	68	80	47	54	83	82	51	100	41	48
USK	44	43	31	41	49	23	80	41	100	37
MAS	36	41	25	30	43	38	37	48	37	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-11	5	-11	12	-10
ACC	0	0	11	-12	0	0	16	-17	20	-17
TEA	0	11	0	1	5	-7	3	-9	14	8
MOD	0	-12	1	0	-4	-7	-2	-12	7	-2
BEL	0	0	5	-4	0	-4	-1	-2	11	-8
SLF	-11	0	-7	-7	-4	0	-5	-2	-5	4
ED2	5	16	3	-2	-1	-5	0	-1	0	-8
TLK	-11	-17	-9	-12	-2	-2	-1	0	8	2
USK	12	20	14	7	11	-5	0	8	0	3
MAS	-10	-17	8	-2	-8	4	-8	2	3	0

TIME 2

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	71	65	78	69	29	63	54	55	22
ACC	71	100	51	45	77	53	74	72	66	22
TEA	65	51	100	48	50	28	36	35	36	20
MOD	78	45	48	100	53	27	48	47	47	31
BEL	69	77	50	53	100	40	61	74	50	27
SLF	29	53	28	27	40	100	24	83	24	39
ED2	63	74	36	48	61	24	100	58	85	22
TLK	54	72	35	47	74	83	58	100	53	48
USK	55	66	36	47	50	24	85	53	100	25
MAS	22	22	20	31	27	39	22	48	25	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	71	65	78	69	38	51	47	43	27
ACC	71	100	46	55	77	53	50	71	43	34
TEA	65	46	100	51	45	24	33	37	28	18
MOD	78	55	51	100	54	29	48	45	41	21
BEL	69	77	45	54	100	41	61	75	52	36
SLF	38	53	24	29	41	100	27	83	23	40
ED2	51	50	33	48	61	27	100	47	85	22
TLK	57	71	37	45	75	83	47	100	40	48
USK	43	43	28	41	52	23	85	40	100	19
MAS	27	34	18	21	36	40	22	48	19	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-9	12	-3	12	-5
ACC	0	0	5	-10	0	0	24	1	23	-12
TEA	0	5	0	-3	5	4	3	-2	8	2
MOD	0	-10	-3	0	-1	-2	0	2	6	10
BEL	0	0	5	-1	0	-1	0	-1	-2	-9
SLF	-9	0	4	-2	-1	0	-3	0	1	-1
ED2	12	24	3	0	0	-3	0	11	0	0
TLK	-3	1	-2	2	-1	0	11	0	13	0
USK	12	23	8	6	-2	1	0	13	0	6
MAS	-5	-12	2	10	-9	-1	0	0	6	0

TIME 3

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	76	72	86	85	54	64	68	61	39
ACC	76	100	65	51	81	74	75	75	75	33
TEA	72	65	100	72	64	48	43	48	63	35
MOD	86	61	72	100	73	45	52	61	60	39
BEL	85	81	64	73	100	59	65	83	63	41
SLF	54	74	48	45	59	100	32	73	40	46
ED2	64	75	43	52	65	32	100	63	86	30
TLK	68	75	48	61	83	83	63	100	61	59
USK	61	75	53	60	63	40	86	61	100	41
MAS	39	33	35	39	41	46	30	59	41	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	76	72	86	85	56	58	74	50	44
ACC	76	100	55	65	81	74	53	81	46	47
TEA	72	55	100	62	61	40	41	53	36	32
MOD	86	65	62	100	73	48	52	63	45	38
BEL	85	81	61	73	100	60	65	83	56	50
SLF	56	74	40	48	60	100	39	83	34	48
ED2	58	53	41	52	65	39	100	55	86	36
TLK	74	81	53	63	83	83	55	100	47	58
USK	50	46	36	45	56	34	86	47	100	33
MAS	44	47	32	38	50	48	36	58	33	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-2	6	-6	11	-5
ACC	0	0	10	-4	0	0	22	-6	29	-14
TEA	0	10	0	10	3	8	2	-5	17	3
MOD	0	-4	10	0	0	-3	0	-2	15	1
BEL	0	0	3	0	0	-1	0	0	7	-9
SLF	-2	0	8	-3	-1	0	-7	0	6	-2
ED2	6	22	2	0	0	-7	0	8	0	-6
TLK	-6	-6	-5	-2	0	0	8	0	14	1
USK	11	29	17	15	7	6	0	14	0	8
MAS	-5	-14	3	1	-9	-2	-6	1	8	0

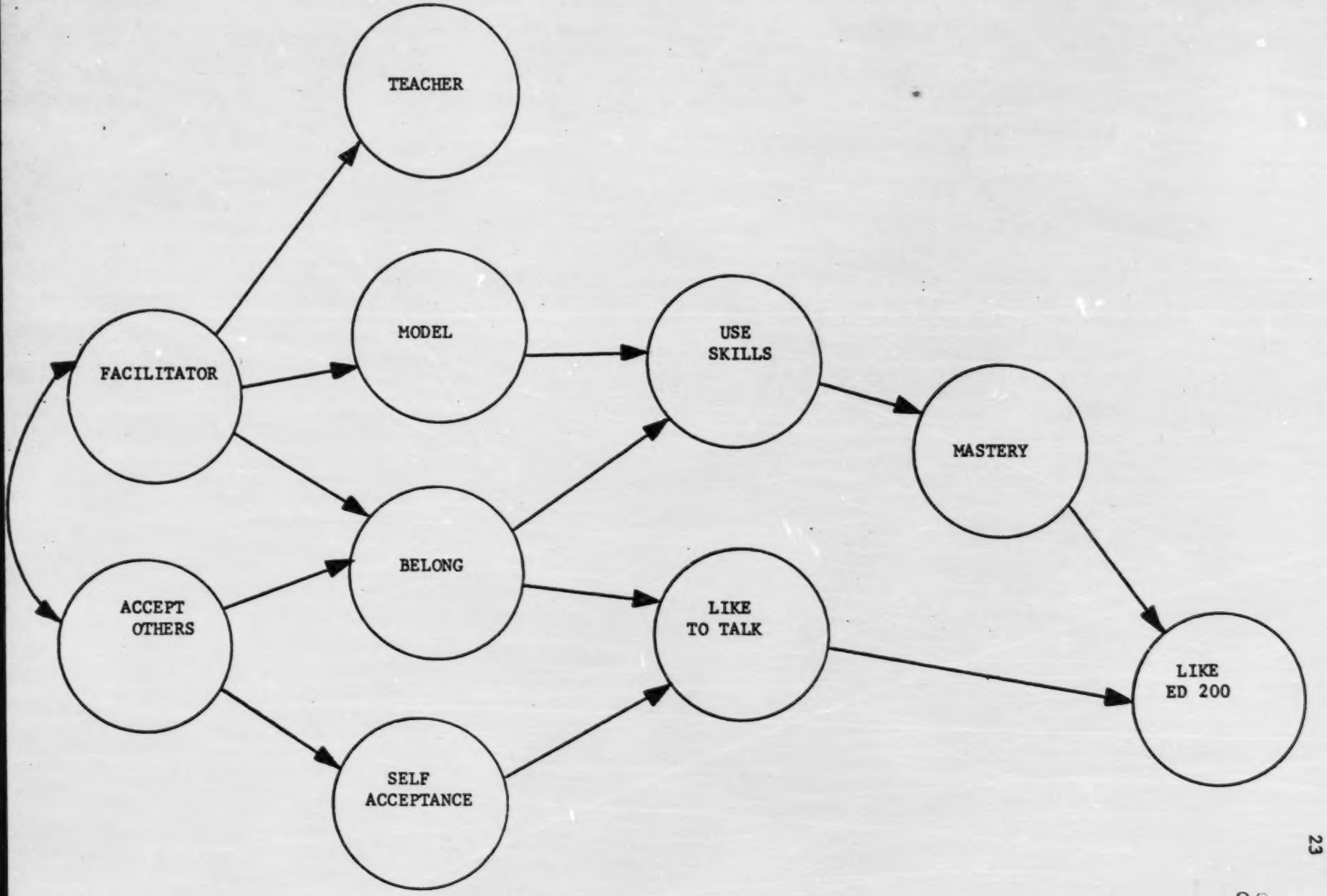

FIGURE 1. Original theoretical relations predicted between attitudes measured.

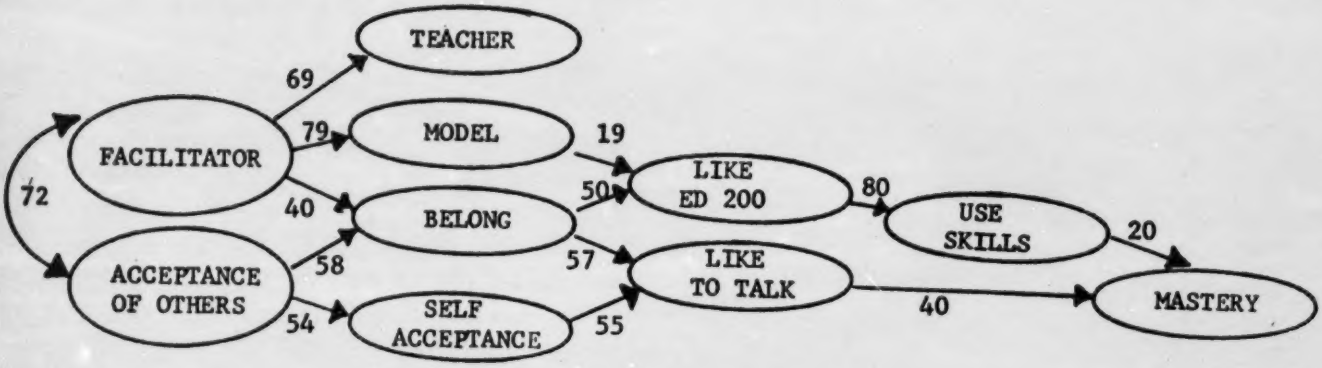

FIGURE 2a Time 1

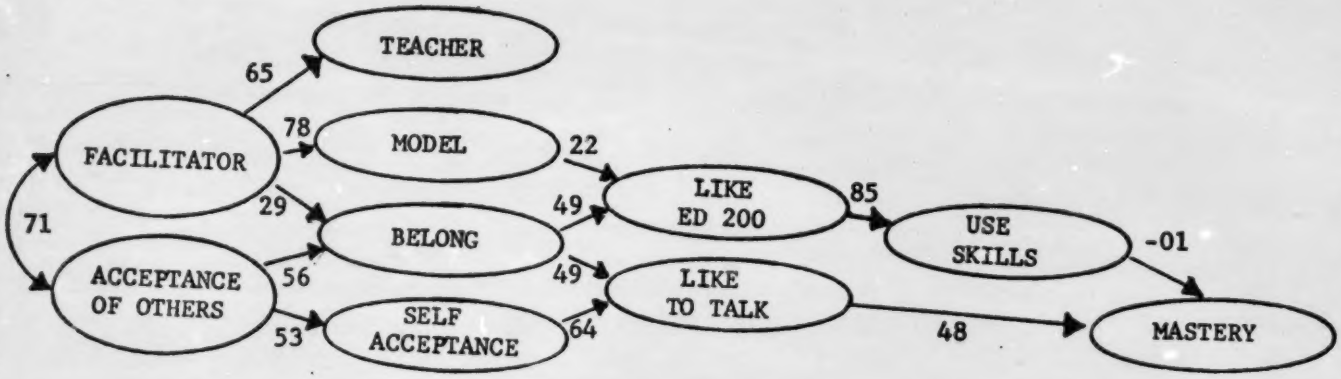

FIGURE 2b Time 2

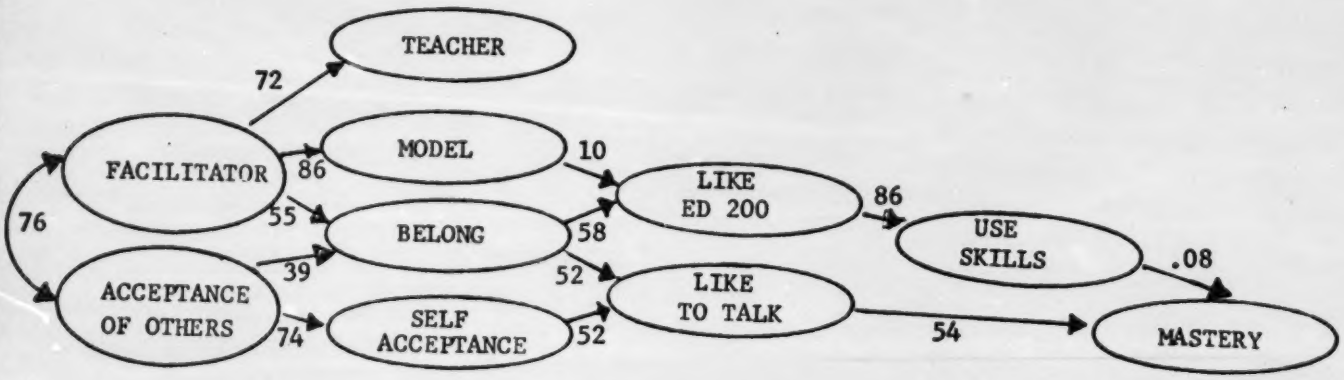

FIGURE 2c Time 3

FIGURE 2 The ordinary least squares estimates of the path coefficients for each administration of the inventory for combined samples.

APPENDIX

The appendix contains the analyses carried out separately on winter and spring quarters, i.e., the analysis to assess the cross-validation of our revised model based on the winter data. Figures A.1 and A.2 contain the observed path coefficients for winter and spring, respectively. Tables A.1 and A.2 contain the observed correlations, the reproduced correlations, and the error matrix for winter and spring, respectively, for each administration of the inventory.

TABLE A.1 The basic assessment of the path analysis at each point in time: the observed correlations, reproduced correlations, and error matrix for each administration of the inventory during Winter quarter.

TIME 1

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	68	63	71	80	23	62	52	52	18
ACC	68	100	54	30	84	51	66	51	52	12
TEA	63	54	100	44	53	10	33	24	36	28
MOD	71	30	44	100	51	17	45	34	41	30
BEL	80	84	53	51	100	35	64	82	59	23
SLF	23	51	10	17	35	100	17	71	8	33
ED2	62	66	33	45	64	17	100	46	80	22
TLK	52	51	24	34	82	71	46	100	46	43
USK	52	52	36	41	59	8	80	46	100	29
MAS	18	12	28	30	23	33	22	43	29	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	68	63	71	80	35	56	69	45	31
ACC	68	100	43	48	84	51	55	79	44	35
TEA	63	43	100	45	50	22	35	43	28	20
MOD	71	48	45	100	56	25	48	49	39	23
BEL	80	84	50	57	100	43	65	86	5w	38
SLF	35	51	22	25	43	100	28	76	22	31
ED2	56	55	35	48	65	28	100	56	80	30
TLK	69	79	43	49	86	76	56	100	45	43
USK	45	44	28	39	52	22	80	45	100	28
MAS	31	35	20	23	38	31	30	43	28	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-12	6	-17	7	-13
ACC	0	0	11	-18	0	0	11	-28	8	-23
TEA	0	11	0	-1	3	-12	-2	-19	8	8
MOD	0	-18	-1	0	-6	-8	-3	-15	2	7
BEL	0	0	3	-6	0	-8	-1	-4	7	-15
SLF	-12	0	-12	-8	-8	0	-11	-5	-14	2
ED2	6	11	-2	-3	-1	-11	0	-10	0	-8
TLK	-17	-28	-19	-15	-4	-5	-10	0	1	0
USK	7	8	8	2	7	-14	0	1	0	1
MAS	-13	-23	8	7	-15	2	-8	0	1	0

TIME 2

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	74	61	78	68	27	63	53	57	20
ACC	74	100	54	42	83	53	77	66	66	22
TEA	61	54	100	46	50	25	37	34	35	15
MOD	78	42	46	100	49	25	46	41	46	34
BEL	68	83	50	49	100	33	65	72	48	29
SLF	27	53	25	25	33	100	26	87	23	41
ED2	63	77	37	46	65	26	100	53	82	23
TLK	53	66	34	41	72	87	53	100	51	46
USK	57	66	35	46	48	23	82	51	100	28
MAS	20	22	15	34	29	41	23	46	28	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	74	61	78	68	39	53	61	43	29
ACC	74	100	45	58	83	53	57	78	47	36
TEA	61	45	100	48	41	24	32	37	26	18
MOD	78	58	48	100	53	31	48	47	40	23
BEL	68	83	41	53	100	44	66	80	54	38
SLF	39	53	24	31	44	100	30	92	25	41
ED2	53	57	32	48	66	30	100	53	82	28
TLK	61	78	37	47	80	92	53	100	44	46
USK	43	47	26	40	54	25	82	44	100	25
MAS	29	36	18	23	38	41	28	46	25	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-12	10	-8	14	-9
ACC	0	0	9	-16	0	0	20	-12	19	-14
TEA	0	9	0	-2	9	1	5	-3	9	-3
MOD	0	-16	-2	0	-4	-6	-2	-6	6	11
BEL	0	0	9	-4	0	-11	-1	-8	-6	-9
SLF	-12	0	1	-6	-11	0	-4	-5	-2	0
ED2	10	20	5	-2	-1	-4	0	0	0	-5
TLK	-8	-12	-3	-6	-8	-5	0	0	7	0
USK	14	19	9	6	-6	-2	0	7	0	3
MAS	-9	-14	-3	11	-9	0	-5	0	3	0

TIME 3

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	78	70	84	90	51	67	65	65	38
ACC	78	100	65	63	84	72	77	73	75	36
TEA	70	65	100	70	61	41	45	43	56	33
MOD	84	63	70	100	72	40	56	63	59	43
BEL	90	84	61	72	100	53	72	78	64	41
SLF	51	72	41	40	53	100	29	77	37	44
ED2	67	77	45	56	72	29	100	63	86	35
TLK	65	73	43	63	78	77	63	100	63	61
USK	65	75	57	59	64	37	86	63	100	48
MAS	38	36	33	43	41	44	35	61	48	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	78	70	84	90	56	66	74	57	47
ACC	78	100	55	66	84	72	61	79	52	49
TEA	70	55	100	59	63	39	47	52	40	33
MOD	84	66	59	100	76	47	58	62	50	40
BEL	90	84	63	76	100	60	72	82	62	52
SLF	56	72	39	47	60	100	44	81	38	47
ED2	66	61	47	58	72	44	100	59	86	44
TLK	74	79	52	62	82	81	59	100	51	59
USK	57	52	40	50	62	38	86	51	100	42
MAS	47	49	33	40	52	47	44	59	42	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-5	1	-9	8	-9
ACC	0	0	10	-3	0	0	16	-6	23	-13
TEA	0	10	0	11	-2	2	-2	-9	17	0
MOD	0	-3	11	0	-4	-7	-2	1	9	3
BEL	0	0	-2	-4	0	-7	0	-4	2	-11
SLF	-5	0	2	-7	-7	0	-15	-4	-1	-3
ED2	1	16	-2	-2	0	-15	0	4	0	-9
TLK	-9	-6	-9	1	-4	-4	4	0	12	2
USK	8	23	17	9	2	-1	0	12	0	6
MAS	-9	-13	0	3	-11	-3	-9	2	6	0

TABLE A.2 The assessment of the path analysis at each point in time for Spring quarter: the observed correlations, the reproduced correlations, and the error matrix for each administration.

TIME 1

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	76	74	86	86	36	56	62	59	35
ACC	76	100	66	56	90	56	75	73	71	34
TEA	74	66	100	63	68	29	50	48	50	37
MOD	86	56	63	100	68	31	51	47	50	25
BEL	86	90	68	68	100	49	60	82	60	47
SLF	36	56	29	31	49	100	33	88	28	52
ED2	56	75	50	51	60	33	100	56	81	36
TLK	62	73	48	47	82	88	56	100	50	56
USK	59	71	50	50	60	28	81	50	100	48
MAS	35	34	37	25	47	52	36	56	48	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	76	74	86	86	43	57	71	46	42
ACC	76	100	56	65	90	56	55	81	44	47
TEA	74	56	100	64	64	31	42	52	34	31
MOD	86	65	64	100	74	37	54	61	44	38
BEL	86	90	64	74	100	50	61	83	50	49
SLF	43	56	31	37	50	100	31	89	25	44
ED2	57	55	42	54	61	31	100	51	81	43
TLK	71	81	52	61	83	89	51	100	41	54
USK	46	44	34	44	50	25	81	41	100	44
MAS	42	47	31	38	49	44	43	54	44	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-7	-1	-9	13	-7
ACC	0	0	10	-9	0	0	20	-8	27	-13
TEA	0	10	0	-1	4	-2	8	-4	16	6
MOD	0	-9	-1	0	-6	-6	-3	-14	6	-13
BEL	0	0	4	-6	0	-1	-1	-1	10	-2
SLF	-7	0	-2	-6	-1	0	2	-1	3	8
ED2	-1	20	8	-3	-1	2	0	5	0	-7
TLK	-9	-8	-4	-14	-1	-1	5	0	9	2
USK	13	27	16	6	10	3	0	9	0	4
MAS	-7	-13	6	-13	-2	8	-7	2	4	0

TIME 2

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	68	71	78	71	30	61	55	53	23
ACC	68	100	47	48	69	53	70	78	65	21
TEA	71	47	100	48	50	31	33	35	34	23
MOD	78	48	48	100	56	29	50	51	46	24
BEL	71	69	50	57	100	49	56	78	54	24
SLF	30	53	31	29	69	100	21	78	23	35
ED2	61	70	33	50	57	21	100	62	88	19
TLK	55	78	35	51	78	78	62	100	53	48
USK	53	65	34	46	54	23	88	53	100	19
MAS	23	21	23	24	24	35	19	48	19	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	68	71	78	71	36	50	56	44	26
ACC	68	100	48	53	69	53	43	64	38	30
TEA	71	48	100	55	50	26	36	40	31	18
MOD	78	53	55	100	55	28	49	44	43	19
BEL	71	69	50	55	100	37	57	71	50	33
SLF	36	53	26	28	37	100	23	71	20	36
ED2	50	43	36	49	57	23	100	42	88	14
TLK	56	64	40	44	71	71	42	100	37	49
USK	44	38	31	43	50	20	88	37	100	10
MAS	26	30	18	19	33	36	14	49	10	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	0	0	0	-6	11	-1	9	-3
ACC	0	0	-1	-5	0	0	27	14	27	-9
TEA	0	-1	0	-7	0	5	-3	-5	3	5
MOD	0	-5	-7	0	2	1	1	7	3	5
BEL	0	0	0	2	0	12	0	7	4	-9
SLF	-6	0	5	1	12	0	-2	7	3	-1
ED2	11	27	-3	1	0	-2	0	20	0	5
TLK	-1	14	-5	7	7	7	20	0	16	-1
USK	9	27	3	3	4	3	0	16	0	9
MAS	-3	-9	5	5	-9	-1	5	-1	9	0

TIME 3

OBSERVED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	75	75	89	80	58	58	71	57	40
ACC	75	100	65	57	76	77	73	79	75	30
TEA	75	65	100	74	68	57	41	55	49	37
MOD	89	57	74	100	74	51	47	58	60	34
BEL	80	76	68	74	100	66	56	89	62	42
SLF	58	77	57	51	66	100	36	91	41	48
ED2	58	73	41	47	56	36	100	61	85	21
TLK	71	79	55	58	89	91	61	100	57	55
USK	57	75	49	60	62	41	85	57	100	32
MAS	40	30	37	34	42	48	21	55	32	100

REPRODUCED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	100	75	63	71	84	38	58	73	47	33
ACC	75	100	47	53	87	51	57	81	46	36
TEA	63	47	100	45	53	24	37	46	29	21
MOD	71	53	45	100	60	27	50	52	40	25
BEL	84	87	53	60	100	44	65	86	52	39
SLF	38	51	24	27	44	100	29	77	23	32
ED2	58	57	37	50	65	29	100	56	80	31
TLK	73	81	46	52	86	77	56	100	45	43
USK	47	46	29	40	52	23	80	45	100	29
MAS	33	36	21	25	39	32	31	43	29	100

OBSERVED MINUS PREDICTED CORRELATIONS

	FAC	ACC	TEA	MOD	BEL	SLF	ED2	TLK	USK	MAS
FAC	0	0	12	18	-4	20	0	-2	10	7
ACC	0	0	18	4	-11	26	16	-2	29	-6
TEA	12	18	0	29	15	33	4	9	20	16
MOD	18	4	29	0	14	24	-3	6	20	9
BEL	-4	-11	15	14	0	22	-9	3	10	3
SLF	20	26	33	24	22	0	7	14	18	16
ED2	0	16	4	-3	-9	7	0	5	5	-10
TLK	-2	-2	9	6	3	14	5	0	12	12
USK	10	29	20	20	10	18	5	12	0	3
MAS	7	-6	16	9	3	16	-10	12	3	0

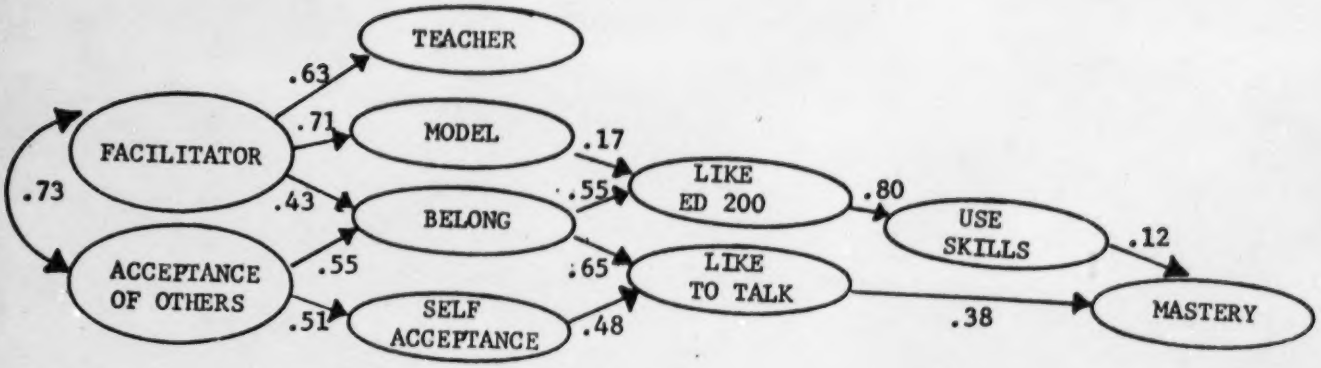

FIGURE A.1a Time 1

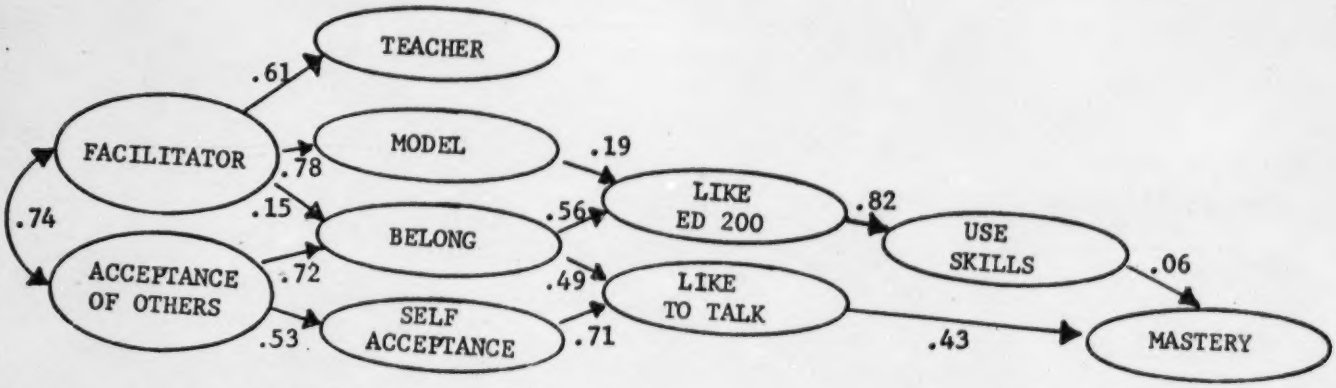

FIGURE A.1b Time 2

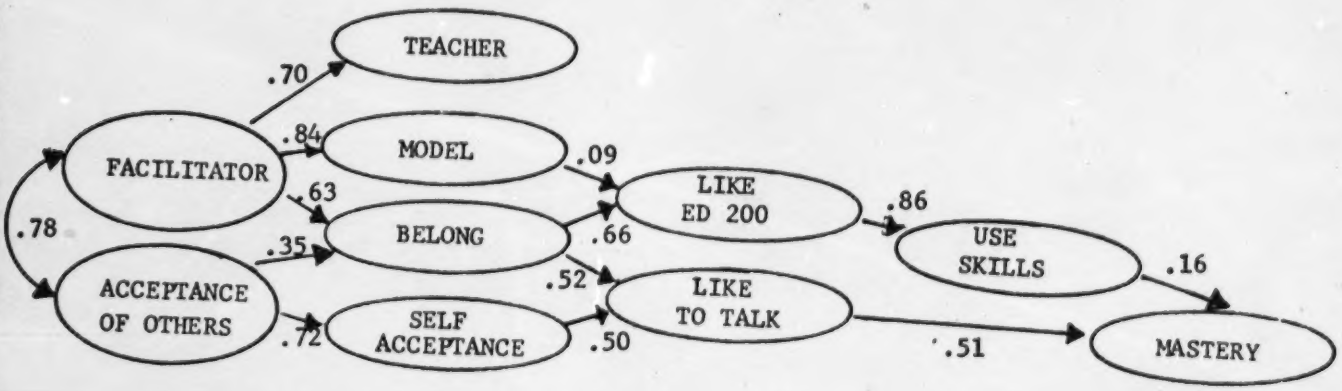

FIGURE A.1c Time 3

FIGURE A.1 The ordinary least squares estimates of the path coefficients for each administration of the inventory during Winter, 1977.

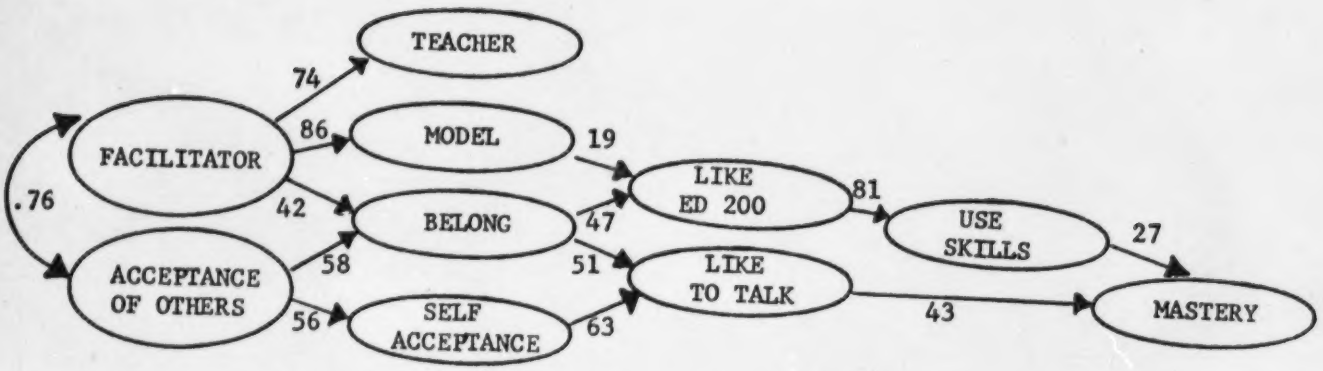

FIGURE A.2a Time 1

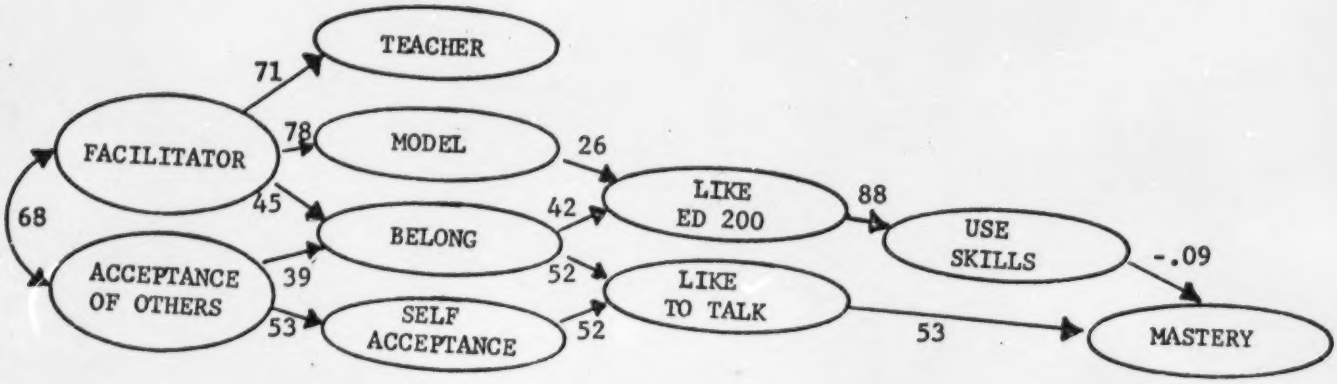

FIGURE A.2b Time 2

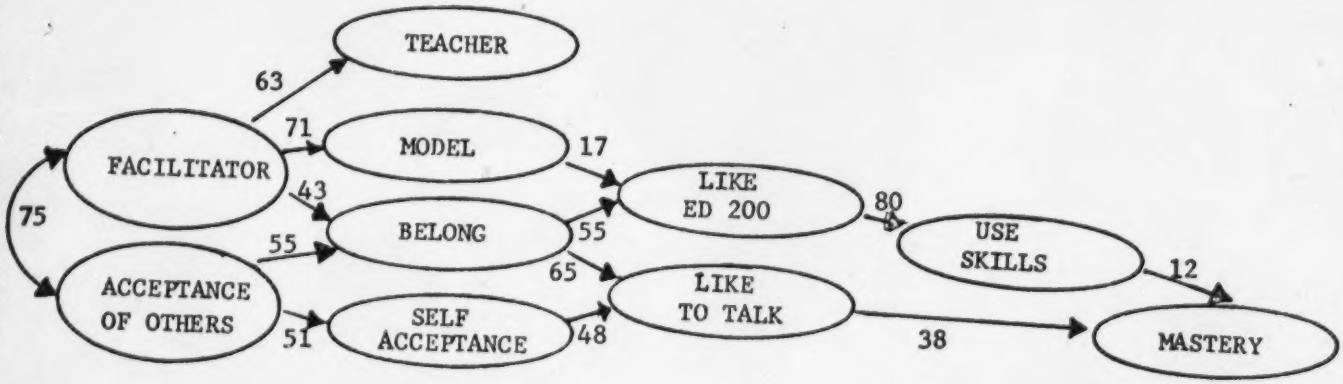

FIGURE A.2c Time 3

FIGURE A.2 The ordinary least squares estimates of the path coefficients for each administration of the inventory for Spring, 1977.